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Two new species of soil mites (Acari, Oribatida, Oppiidae and Machuellidae) from Turkey

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Abstract

Two new species of soil mites (Acari: Oribatida), *Machuella turcica* **sp. nov.** (Machuellidae) and *Oxyoppia* (*Dzarogneta*) *ilicaensis* **sp. nov.** (Oppiidae) are described from Turkey. They were collected from moss on rocks and litter under oak trees respectively. A key to the known species of the genus *Machuella* Hammer, 1961 is provided.

Key words: Acari, Oribatida, Oppiidae, Machuellidae, soil mites, new species, Turkey

Introduction

Prior to this study there was no record for the family Machuellidae Balogh, 1983 and subfamily Oxyoppiinae Subías, 1989 from Turkey. The subfamily Machuellinae, with two genera, *Machuella* Hammer, 1961 and *Gredosella* Gil-Martin *et al*., 2000, was created by Balogh (1983) within the family Oppiidae Grandjean, 1951. Later Subías & Balogh (1989) considered that this subfamily had to be excluded from the Oppiidae, and it is now considered as a separate family within the Oppioidea (Subías & Arillo, 1993). The genus *Machuella* Hammer, 1961 is recognized by long epimeral setae directed toward the centre of the epimeral region to form a basket, within a thick layer of secretion. There are three known species and five subspecies of the genus *Machuella* (Subias, 2004). The subgenus *Oxyoppia* (*Dzarogneta*) Kuliev, 1978 is recognized by the well developed humeral process, well developed lamellar crests, and five or six pairs of genital setae.

In the present paper, two new species, *Machuella turcica* **sp. nov.** (Machuellidae) and *Oxyoppia* (*Dzarogneta*) *ilicaensis* **sp. nov.** (Oppiidae) from Turkey are described. They were collected from moss on rocks and litter under oak trees respectively.

Material and methods

Mites were collected in soil and litter samples from Erzurum province and extracted using a Berlese funnel apparatus. They were fixed and stored in 70% ethanol. Mites were sorted from the samples under a stereomicroscope and mounted on slides in modified Hoyer's medium or 35% lactic acid. Drawings were made with the aid of a camera lucida attached to a compound microscope.

The terminology used in this paper follows Grandjean (see Travé & Vachon 1975), Balogh (1983) and Subías & Balogh (1989). All measurements are given in micrometres (μm). Type material and specimens

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examined are deposited in the Zoological Museum of Atatürk University, Erzurum,Turkey and two paratypes of *Oxyoppia* (*Dzarogneta*) *ilicaensis* will be deposited in Australian National Insect Collection, Canberra.

Genus *Machuella* Hammer, 1961

Machuella Hammer, 1961a: 70.
Type species *Machuella ventrisetosa* Hammer, 1961, by monotype.

Machuella turcica sp. nov.
(Fig. 1)

Material examined. Holotype: female, Karayazı, Geyikli, Erzurum, Turkey, 39°.42' N, 42°.09'E, 8 June 2000, from moss on rock. Holotype preserved in 70% ethanol, at the Acarology Laboratory of Atatürk University, Erzurum, Turkey.

Description. Holotype. Length 213, width 100.

Prodorsum (Fig. 1A). Rostrum gradually narrowing anteriorly, pointed at tip and undivided. Rostral (*ro*) and lamellar (*le*) setae arising laterally and close to each other, widely separated from the interlamellar (*in*) setae. Rostral setae do not reach the rostral tip. All prodorsal setae short (*ro* 7 µm; *le* 10 µm; *in* 5µm) and smooth. A transverse chitinous band lies across the rostrum at some distance behind tip, rostral setae are situated on this band. A pair of light spots is located between the bothridia. Interlamellar setae are situated at the top of interbothridial tubercles. Sensillus with a clavate head without cilia, and a pointed tip.

Notogaster (Fig. 1A). Oval shaped, anterior border convex, decurrent lines from dorsosejugal margin absent. Notogaster with ten pairs of setae: setae long, fine, smooth, six anterior pairs straight and four posterior pairs curved. A few muscular insertions present postero-laterally.

Venter (Fig. 1B). Epimeral setae long, directed toward centre of epimeral region; forming a basket, with a thick layer of secretion. Insertion points of epimeral setae visible through the secretion. Posterior margin of epimeral region with five pairs of long setae. Five pairs of genital setae present; insertion points of setae g_4 and g_5 visible, setae g_3 longer than g_2 and g_1. Anal opening oval,slightly larger than the genital opening. One pair of aggenital, two pairs of anal and three pairs of adanal setae present. Setae ad_3 in adanal position. Lyrifissures *iad* in para-anal position.

Etymology. The species name is derived from the country, Turkey, in which it was found.

Notes. The new species differs from the other species of the genus by lacking a decurrent line or lines from the dorsosejugal margin of the notogaster, and the notogastral setae are not inserted in a row (Hammer, 1961a, b, 1973). Subías & Arillo (1993) and Subías (2004) established the synonymy of some species of *Machuella*, and the existing species may be separated as follows.

Key to the known species of *Machuella*

1. No decurrent line or lines from dorsosejugal margin running towards end of notogaster 2
   Decurrent lines present, running from dorsosejugal margin towards end of notogaster 3
2. Notogastral setae short and aligned in a longitudinal row, one behind the other . *M. lineata* Hammer, 1973
   Notogastral setae not aligned in a longitudinal row, setae forming a zigzag pattern ..... *M. turcica* **sp. nov.**
3. At least six pairs of epimeral setae present anterior to genital opening ..... *M. draconis* Hammer, 1961
   Three or four pairs of epimeral setae present anterior to genital opening .... *M. ventrisetosa* Hammer, 1961

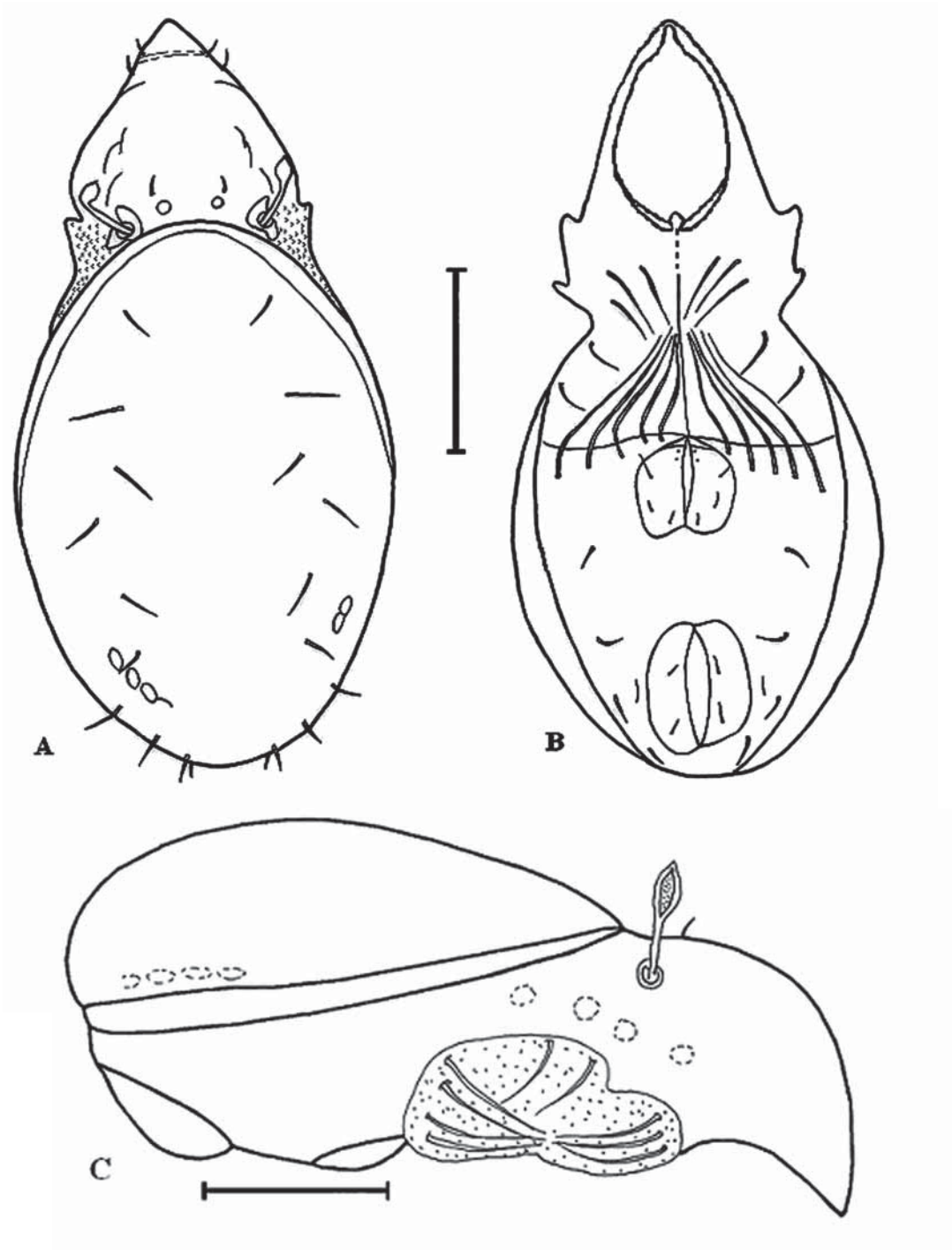

FIGURE 1. *Machuella turcica* **sp. nov.** A. Dorsum, B. Venter, C. Lateral aspect (scale bar 50 μm).

***Oxyoppia* (*Dzarogneta*) Kuliev, 1978**

Type species *Oxyoppia dubia* Kuliev 1966, by original designation.

***Oxyoppia* (*Dzarogneta*) *ilicaensis* sp. nov.**
(Figs 2–4)

Material examined. Holotype and 16 paratypes, Ilıca, Erzurum, Turkey, 39°.57' N, 41°.06' E, 27 July 1999,

from litter under oak tree. The holotype and 14 paratypes are preserved in 70% ethanol, at the Acarology Laboratory of Atatürk University, Erzurum, Turkey. Two paratypes in the Australian National Insect Collection, Canberra.

Description. Holotype, length 369, width 193.

Prodorsum (Figs 2A, 3B). Rostrum rounded and undivided. Rostral setae dorsally inserted, robust. Two lines form an inverse "V" shape running to the tip of rostrum, between the rostral setae. Prodorsum with well developed lamellar crests, slightly sinuate, broad; posteriorly reaching inner edge of bothridia. Lamellar setae and rostral setae strong, ciliated; interlamellar setae thin. Interlamellar setae shorter (15 μm) than rostral (36 μm) and lamellar setae (30 μm). Sensillus fusiform, ciliate on its outer border, with 11–12 cilia, finely tapering, curved anteriorly.

Notogaster (Fig. 2A, 3A) Oval shaped, slightly pointed anteriorly, with well developed humeral process. Ten pairs of notogastral setae present. Setae *c2* very fine, barely visible, less developed than other notogastral setae, and situated between the humeral process (Fig. 4B). Other setae strong, with barely visible barbs, thin at the tip (Fig. 4A). Notogastral heterotrichy present (setae *p1*, *p2*, *p3* and *h1* are shorter; approximately half length of other notogastral setae); setae *p3* as long as the distance between setae *p3* and *p2*, *p2* as long as the distance between setae *p2* and *p1*; *h1* as long as the distance between setae *h1* and *p1* (Figs 2A, 3A).

Venter (Fig. 2B). Epimeral region strongly sclerotized, with well-developed epimeres. Epimeral borders distinctly visible, thick. Five pairs of genital setae present. Anal opening oval, bigger than genital opening. Lyrifissures *iad* inverse, apoanal in position, curved outwards. Epimeral, aggenital and adanal setae strong. Setae ad_1 in postanal, setae ad_2 in para-anal and setae ad_3 in preanal positions.

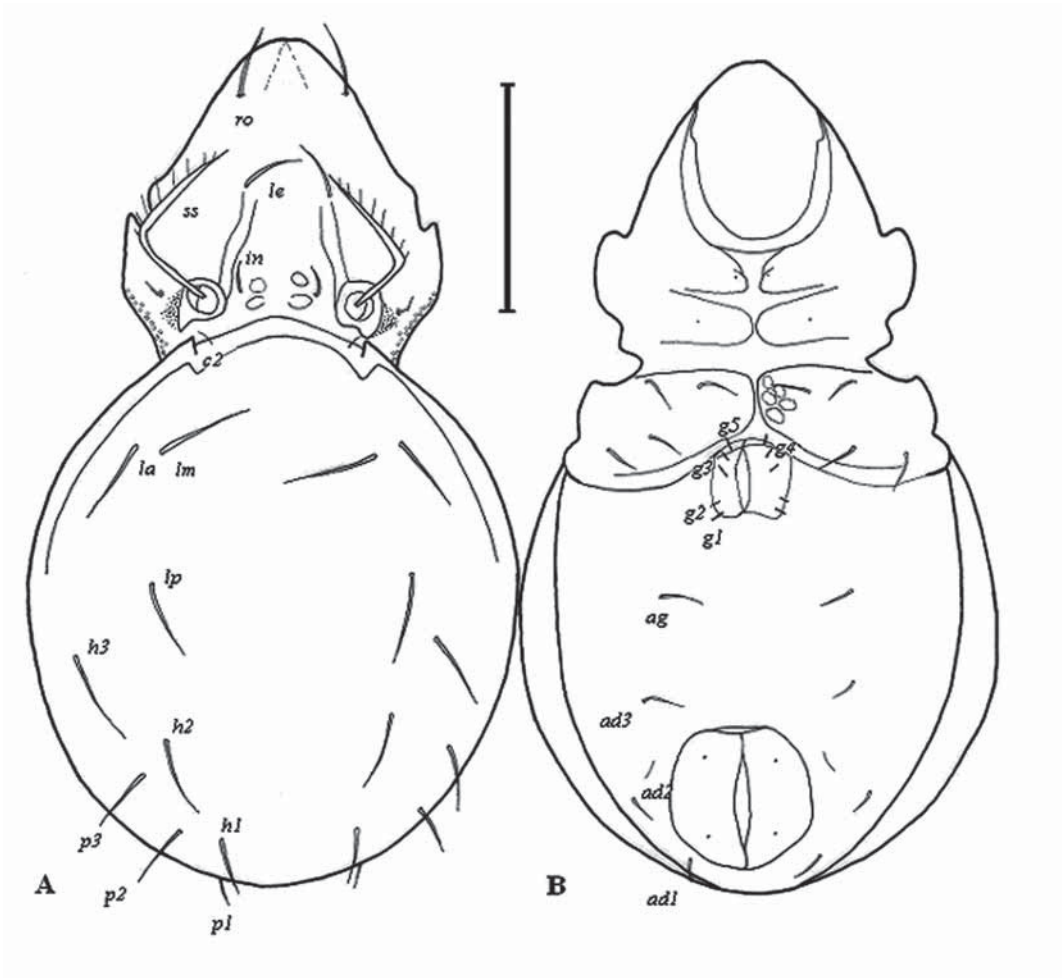

FIGURE 2. *Oxyoppia* (*Dzarogneta*) *ilicaensis* **sp. nov.** A. Dorsum, B. Venter. (scale bar 100 μm).

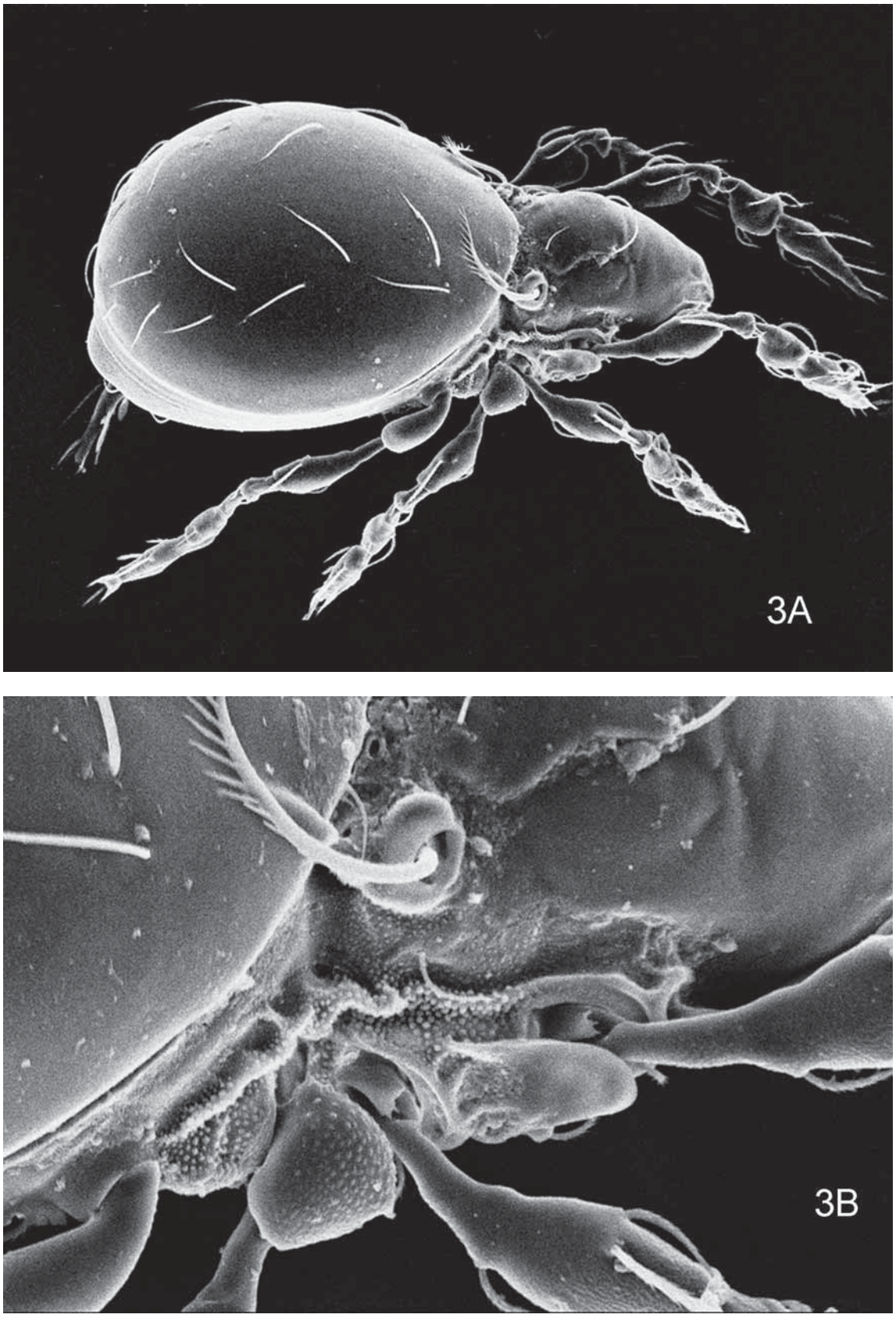

FİGURE 3. *Oxyoppia* (*Dzarogneta*) *ilicaensis* **sp. nov.** Scanning electron microscope photographs. A. (top) dorsal view of adult, B. (bottom) exobothridial region.

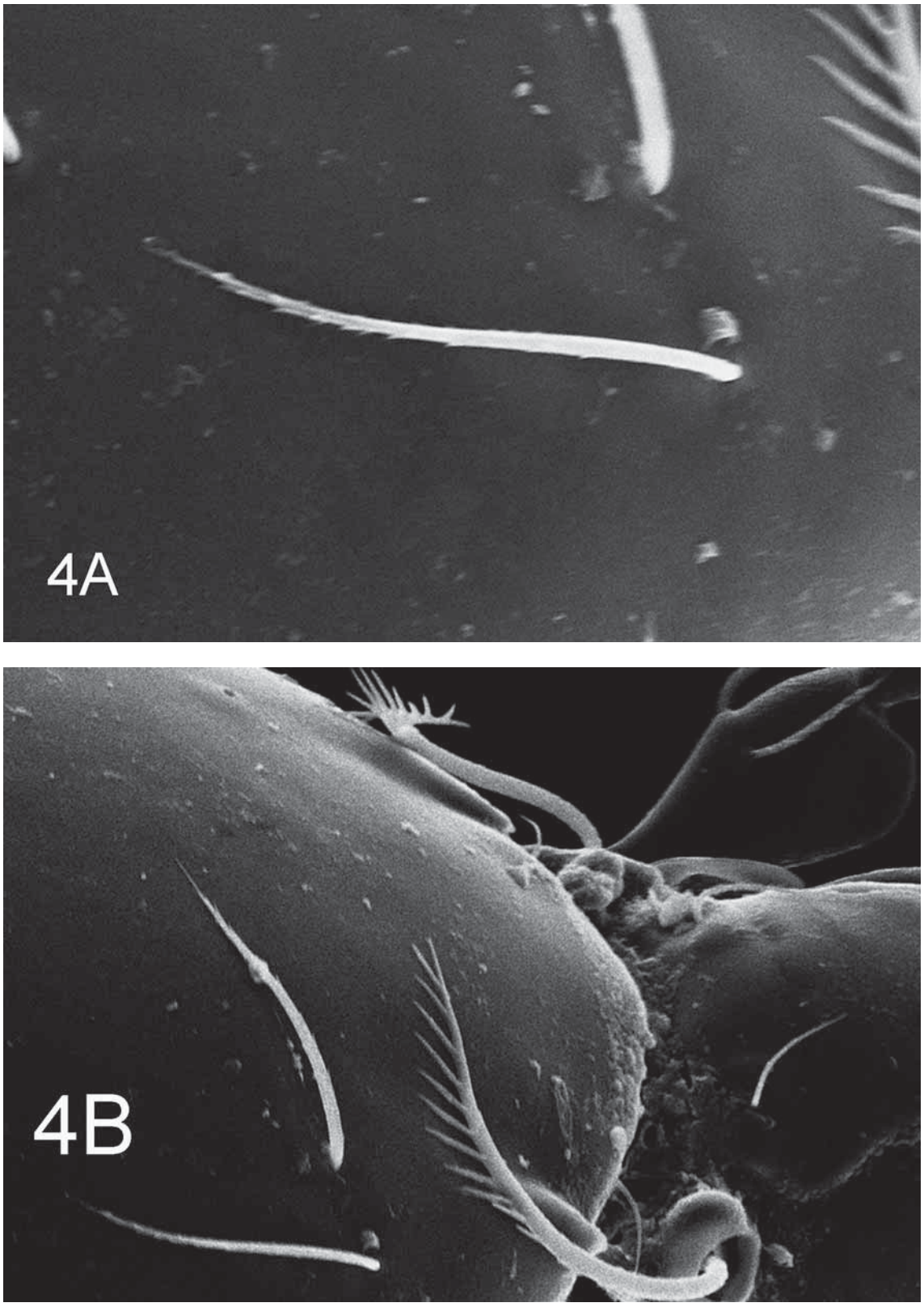

FIGURE 4. *Oxyoppia* (*Dzarogneta*) *ilicaensis* **sp. nov.** Scanning electron microscope photographs. A (top) setae *la*, B (bottom) setae c_2 and humeral process.

Etymology. The species name is derived from the type locality, Ilıca town.

Notes. The new species differs from the type species *Oxyoppia* (*Dzarogneta*) *dubia* (Kuliev, 1966) by its

larger body size (365–371 / 192–197 in our specimens, 305–326/178 in *O* (*D*) *dubia*); the notogastral heterotrichy (setae *p1*, *p2*, *p3* and *h1* are short, approximately half the length of the other notogastral setae); the short and thin interlamellar setae (setae *in* half as long as *le*); and the location of epimeral setae *3a* and *4a* with respect to each other.

There are some difference between the two descriptions of *Oxyoppia*(*D*) *dubia* in 1966 and 1978. In the original description of *Oxyoppia*(*D*) *dubia* its body size is given as 305/167 μm, sensillus with 8–9 cilia, 10 pairs of notogastral setae (without setae *c2*) and rostrum dentate (Kuliev, 1966). In the description of the subgenus *Dzarogneta*, *Oxyoppia* (*D*) *dubia* is described with body size 305–326/178, sensillus with 12 cilia, 9 pairs of notogastral setae (without setae *c2*) and rostrum not dentate (Kuliev, 1978). Here we have compared the new species with the latter description.

The new species is very similar to *O*. (*D*.) *cristata* Hammer 1977, but differs from it by having five pairs of genital setae instead of six pairs; the position and shape of lyrifisurres *iad*, and the presence of two pairs of interbothridial light spots. The new species also differ from *O*. (*D*.) *intermedia* by its larger body size (365–371/192–197 in the new species, 263–297/133–157 in *O*. (*D*.) *intermedia*); the position and shape of lyrifisurres *iad*. The new species differ from *O*. (*D*.) y*epesensis* by the shape of the sensillus and the shape and position of the costula.

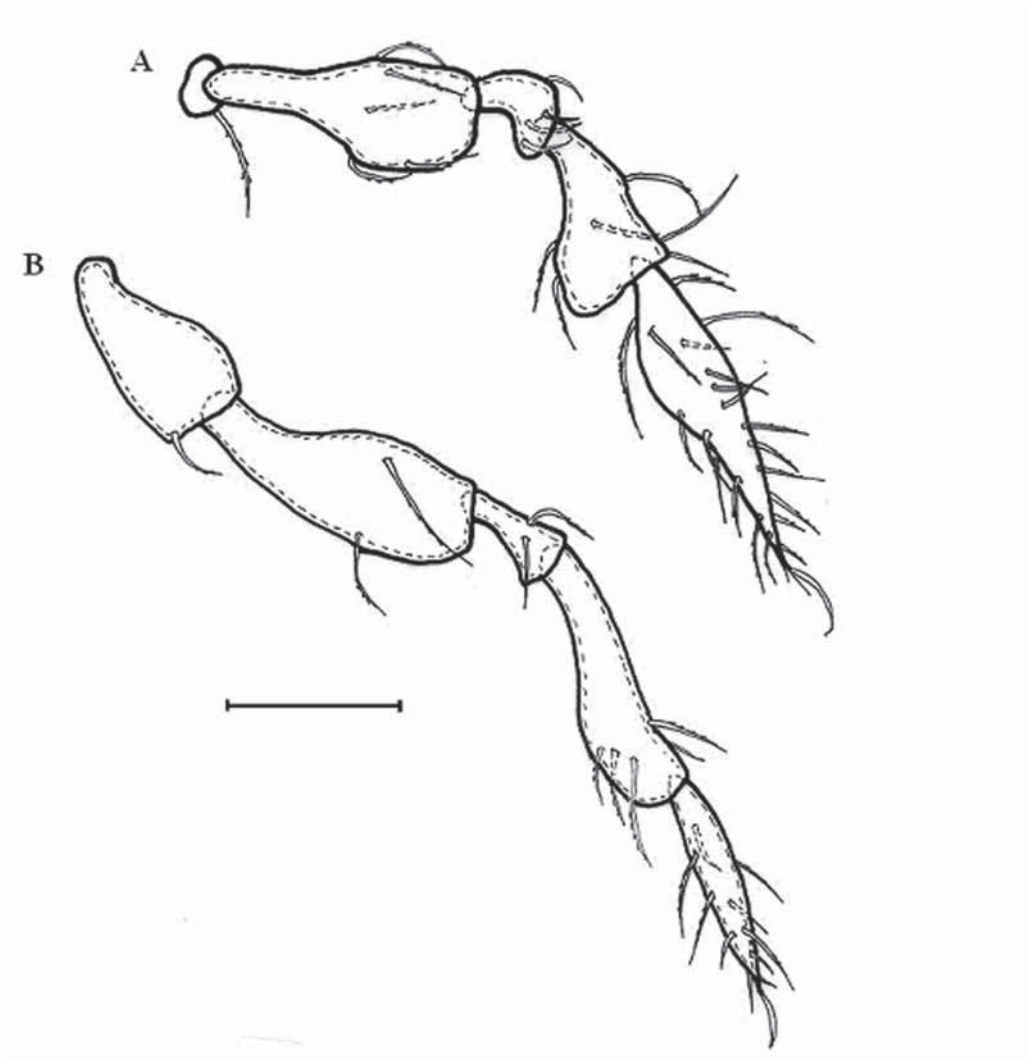

FIGURE 5. *Oxyoppia* (*Dzarogneta*) *ilicaensis* **sp. nov.**A. Leg I, B. Leg IV (scale bar 50 μm).

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